

EXHIBIT 7

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Motions, Pleadings and Filings

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United States District Court, D. Delaware.
 C.R. BARD, INC., Plaintiff,
 v.
 MEDTRONIC, INC., Defendant.
 No. C.A. 96-589-SLR.

June 15, 1999.

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MEMORANDUM OPINION

ROBINSON, District J.

I. INTRODUCTION

*1 Currently before the court are a renewed motion for judgment as a matter of law ("JMOL") filed by defendant Medtronic, Inc., as well as a motion for a permanent injunction and a motion to amend the judgment filed by plaintiff C.R. Bard, Inc. (D.I.169, 172) These motions arise out of a May 29, 1998 jury verdict finding defendant liable for willful infringement under the doctrine of equivalents of a patent assigned to plaintiff. (D.I.153) Plaintiff is the assignee of U.S. Patent No. 5,484,474 ("the '474 patent"), which discloses an "Inverted Dome Arterial Filter" for use in, *inter alia*, cardiopulmonary bypass surgeries, blood transfusions, and dialysis treatments. The filter is a component in an "extracorporeal blood flow circuit" in which blood flows from a patient's body, through an oxygenator, and into the filter before it returns to the

patient's body. The filter traps and removes particulate and gaseous matter from arterial blood.

Defendant competes with plaintiff in the manufacture and sale of arterial filters. In its complaint, plaintiff alleged that defendant's arterial filter infringed several claims of the '474 patent. (D.I.1) Defendant denied infringement and asserted affirmative defenses, including invalidity and prosecution history estoppel. (D.I.6)

At trial, only the housing element of the '474 patent was in dispute. The housing element of the patent-in-suit teaches "a housing defining a substantially toroidal flow path." (*See, e.g.*, D.I. 171, Ex. K, col. 8, lns. 26-27) In a pretrial claim construction order, the court construed the housing element "such that the housing (although not necessarily toroidal in shape) must determine with precision a fluid flow path having the shape of a substantially closed curve which rotates about, but does not intersect or contain, an axis in its own plane." (D.I. 135 at 3-4) This claim element is included in claims 1, 3-6, 8, 10-13, and 15 of the '474 patent.

On May 19 through May 28, 1998, the court held a jury trial on the issues of infringement and validity. The court submitted the issues to the jury by way of special interrogatories. The interrogatories asked the jury to answer, with a yes or no, whether claims 1, 3-6, 8, 10-13, and 15 of the '474 patent were infringed either literally or under the doctrine of equivalents and whether each claim was invalid due to anticipation or obviousness. (D.I.153) The jury returned its verdict on May 29, 1998. It found that defendant's arterial filter did not literally infringe claims 1, 3-6, 8, 10-13, and 15 of the '474 patent; however, it determined that defendant willfully infringed these claims under the doctrine of equivalents. The jury also concluded that the '474 patent was not invalid. The jury awarded plaintiff \$3,277,534.00 in damages, which it calculated based upon a \$26 royalty for each arterial filter sold by defendant. (D.I.153) The court entered judgment against defendant on June 1, 1998 in the same amount. (D.I.157)

*2 At the close of plaintiff's case, defendant moved under Fed.R.Civ.P. 50(a) for JMOL. (D.I.140) The court reserved judgment on the motion. (D.I. 162 at 501-02) Defendant now renews its motion for JMOL and moves, in the alternative, for a new trial under Fed.R.Civ.P. 59. (D.I.169) Defendant requests entry of

judgment that (1) the housing element of its arterial filters does not infringe the claims of the '474 patent; (2) its filter element support does not infringe the '474 patent; (3) the subject matter of the '474 patent was obvious and that the '474 patent is therefore invalid; (4) the royalty calculated by the jury was excessive; and (5) plaintiff failed to present sufficient evidence of willfulness. (D.I.170) Plaintiff moves the court to amend the judgment and to issue a permanent injunction. (D.I.172) For the following reasons, the court shall deny defendant's motion and grant in part plaintiff's motions.

II. STANDARD OF REVIEW

To prevail on a renewed motion for JMOL following a jury trial, a party "must show that the jury's findings, presumed or express, are not supported by substantial evidence or, if they were, that the legal conclusion(s) implied [by] the jury's verdict cannot in law be supported by those findings." *Pannu v. Iolab Corp.*, 155 F.3d 1344, 1348 (Fed.Cir.1998) (quoting *Perkin-Elmer Corp. v. Computervision Corp.*, 732 F.2d 888, 893 (Fed.Cir.1984)). "Substantial" evidence is such relevant evidence from the record taken as a whole as might be accepted by a reasonable mind as adequate to support the finding under review." *Perkin-Elmer Corp.*, 732 F.2d at 893. In assessing the sufficiency of the evidence, the court must draw all reasonable inferences from the evidence in the light most favorable to the nonmovant. *See id.*; *Richardson-Vicks Inc. v. UpJohn Co.*, 122 F.3d 1476, 1479 (Fed.Cir.1997). The appropriate inquiry is whether a reasonable jury, given the facts before it, could have arrived at the conclusion it did. *See Dawn Equip. Co. v. Kentucky Farms, Inc.*, 140 F.3d 1009, 1014 (Fed.Cir.1998) (citing *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 975-76 (Fed.Cir.1995) (en banc)). The court may not determine the credibility of the witnesses nor "substitute its choice for that of the jury between conflicting elements of the evidence." *Perkin-Elmer Corp.*, 732 F.2d at 893.

Likewise, in order to promote finality after trial, as well as to preserve the historical function of the jury as the trier of facts, the court "ought to grant a new trial on the basis that the verdict was against the weight of the evidence only where a miscarriage of justice would result if the verdict were to stand." *Williamson v. Consolidated Rail Corp.*, 926 F.2d 1344, 1352 (3d Cir.1991).

III. DEFENDANT'S MOTION FOR JMOL

A. Infringement Under the Doctrine of Equivalents

At issue is whether plaintiff presented substantial evidence at trial to support the jury's finding that defendant's filter infringes claims 1, 3-6, 8, 10-13 and 15 of '474 patent under the doctrine of equivalents. The housing element of these claims teaches "a housing defining a substantially toroidal flow path." The court construed the housing element "such that the housing (although not necessarily toroidal in shape) must determine with precision a fluid flow path having the shape of a substantially closed curve which rotates about, but does not intersect or contain, an axis in its own plane." (D.I. 135 at 3-4) An accused device may infringe under the doctrine of equivalents if "the differences between the claimed invention and the accused device ... are 'insubstantial.'" *Texas Instruments Inc. v. Cypress Semiconductor Corp.*, 90 F.3d 1558, 1563-64 (Fed.Cir.1996).

*3 A finding of insubstantiality turns on whether "the element of the accused device at issue performs substantially the same function, in substantially the same way, to achieve substantially the same result, as the limitation at issue in the claim." *Dawn Equip.*, 140 F.3d at 1016. The United States Supreme Court has indicated that the particular linguistic framework used to test equivalency is not important, so long as it addresses the "essential inquiry [of whether] the accused product or process contain[s] elements identical or equivalent to each claimed element of the patented invention." *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 40 (1997). The Court emphasized that "[t]he determination of equivalence should be applied as an objective inquiry on an element-by-element basis." *Id.*

The doctrine of equivalents thus serves to protect an invention from piracy by the manufacture and sale of substantially similar, though not literally identical, products. *See Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 339 U.S. 605, 607 (1950) (explaining that the doctrine of equivalents prevents others from avoiding the patent by making "unimportant and insubstantial changes and substitutions in the patent"). Applied broadly, however, the doctrine conflicts with the statutory requirement that a patentee distinctly "claim" the invention covered by a patent. *See* 35 U.S.C. § 112; *Hilton Davis*, 520 U.S. at 29. Because of the doctrine's potential to expand a patent's protection beyond the scope of its claims, the Court of Appeals for the Federal Circuit has characterized application of the doctrine as "the exception ... not the rule" in patent infringement actions. *London v. Carson Pirie Scott &*

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Co., 946 F.2d 1534, 1538 (Fed.Cir.1991).

The Federal Circuit also has recognized the risk of jury confusion posed by the doctrine of equivalents. See *Texas Instruments*, 90 F.3d at 1566-67 (noting that "although the standard for infringement under the doctrine of equivalents is simple to articulate, it is conceptually difficult to apply"). To safeguard against jury confusion, the patentee must present both "particularized testimony and linking argument" on why the function, way and result of each element in the accused device is substantially the same as claimed elements. See *Texas Instruments*, 90 F.3d at 1566, 1567; *Lear Siegler, Inc. v. Sealy Mattress Co. of Mich.*, 873 F.2d 1422, 1426 (Fed.Cir.1989); see also *Malta v. Schulmerich Carillons, Inc.*, 952 F.2d 1320, 1327 n. 5 (Fed.Cir.1991). Mere generalized testimony as to the overall similarity between the claims and the accused infringer's product is insufficient to establish infringement under the doctrine of equivalents. See *Comark Communications, Inc. v. Harris Corp.*, 156 F.3d 1182, 1188 (Fed.Cir.1998); *Texas Instruments*, 90 F.3d at 1567. A plaintiff must "articulate the comparison" between the claimed elements and those in the accused device, "[o]therwise there is too much risk the jury will simply compare the two inventions as to overall similarity" *Lear Siegler*, 873 F.2d at 1427; see also *Malta*, 952 F.2d at 1329 (explaining that, under *Lear Siegler*, a patentee "must present 'substantial evidence' comparing the claimed and accused inventions to one another as to each of the three aspects of equivalency") (Michel, J., concurring). Further, "[t]he evidence and argument on the doctrine of equivalents cannot merely be subsumed in plaintiff's case of literal infringement." *Lear Siegler*, 873 F.2d at 1425.

1. The Record Evidence

*4 In support of the jury's verdict, plaintiff relies primarily upon the testimony of its expert witness, Yahuda Tamari. The court notes at the outset that neither counsel nor Tamari ever used words such as "equivalent," "equivalence," or "doctrine of equivalents" in order to identify for the jury the relevant evidence. [FN1] Indeed, there is no clear demarcation between Tamari's testimony regarding literal infringement and his testimony on infringement under the doctrine of equivalents. To the extent that testimony cited by plaintiff is subsumed in plaintiff's literal infringement case (see, e.g., D.I. 161 at 357:23-359:11; 370:6-18), this testimony cannot support the jury verdict. See *Lear Siegler*, 873 F.2d at 1425.

FN1. See, e.g., the following introductory testimony on the doctrine of equivalents:

Q. And going back to the Court [sic] definition [of the housing element] I wanted to ask you some questions about the flow path in [defendant's] device. Does the flow path in [defendant's] device perform any different function in any different way to achieve any different result from the substantially toroidal flow path that is called for in the claims of the patent in suit? A. I don't believe so. I believe that that is what it does and that's what it was designed to do.

(D.I. 161 at 370:19-371:2)

The portion of Tamari's testimony apparently dedicated to the doctrine of equivalents occurred only briefly at the end of his direct examination and again in rebuttal. (See D.I. 161 at 370:19-372:13) There was no dispute at trial that the accused device met all of the limitations of Claim 1 of the '474 patent, [FN2] save for "a housing defining a substantially toroidal flow path" The testimony offered by plaintiff's expert Tamari does not specifically address this limitation, other than describing the housing as "circular." Tamari's testimony instead is directed at the proposition that when blood enters a circular housing from a tangential inlet at a high rate of flow, the flow path will be "substantially toroidal." Based on the physics created by this combination of elements, Tamari concludes in his direct examination as follows:

FN2. Defendant also asks the court to reconsider its construction of the '474 patent's filter element support claim. (D.I. 170 at 13) The court declines to do so.

Q. Let me ask you the question in a slightly different way. If the blood flow path in [defendant's] device is defined and described other than toroidal, does the [defendant's] device and the blood flow path through the [defendant's] device achieve any different function, perform any different function in any different way to achieve any different result than the housing defining a substantially toroidal flow path as called for in the claims of the patent in suit?

A. I believe it does what Claim 1 says. Basically, it has an inlet tangential to the housing and, by definition, because the housing was circular and you have high flow coming in, it's going to give you a toroidal-like flow. Okay? And the reason for the thing, as I mentioned before, to have the flow going around rather than straight is because that way you give the blood more time to stay in this

filter, and that way there's more time for the bubbles to move up and get removed. If you just shoot it right across, that will not work or it will not work as efficiently.

So basically what this does, it puts a tangential port. It has then a gas port at the top which is 180 degrees away from the inlet, and that means it gives you more path. It's not like the port is here. It's all the way across the other way here, so it gives a long path, again to give the gas more time to move up.

Q. Regardless of how you describe the flow path, is there any difference between the flow path in the [defendant's] devices that you examined in terms of function, way and result and the function, way and result achieved by the substantially toroidal flow path as called for in the claims in the patent in suit?

*5 A. There is no difference. The main thing is the toroidal-like flow. What goes in the center is inconsequential.

(D.I. 161 at 371:3-372:13) (emphasis added)
Similarly, in rebuttal testimony, Tamari explains plaintiff's position:

So when you look at the function of this filter as compared to Claim 1, both of them, the main thing at the top now is the main function of this thing is to remove gas bubbles that may enter in the blood and to do so in a very nondamaging way. That is, the least damaging for the blood. The better you can remove bubbles the better. That's basically what people are trying to do with the top part of it.

Well, if you look at it, both the Claim 1 and this device, that's the function is the same. Now we have to look at it, well how do they do that? Well, the [defendant] has a tangential inlet which is called for in Claim 1. It has a circular housing which is called [for] in Claim 1. It has the gas purge port approximately 180 degrees away from the inlet at the highest point on the side, which is called [for] in Claim 1, okay?

And what results from this combination is that you have a flow that is coming in tangential into a circular housing and, therefore, forming a substantially toroidal flow as we just described.

Because this inlet is 180 degrees away from the gas port, it extends the path that the blood has to go from here to here and, therefore, it allows more time for the gas that may be in the blood to move up and into here and you can remove it because of this tangential inlet ... so basically the results of these things are the same, also. We have an efficient device to remove gas bubbles, so the function is the same, the way it's doing it is the same, and the results are the same.

(D.I. 165 at 1224:17-1225:22) (emphasis added)

In a similar vein, plaintiff offered the testimony of another expert, Richard N. Koopman, for the proposition that the two housings function in a substantially similar "way." Plaintiff points to the following testimony of Koopman in support of the jury verdict:

But when I talked about the toroidal flow path, what I was referring to is ... that the flow doesn't bang against the side of the wall. It's essentially redirected by the wall, by the forces.

The fluid wants to go straight and it's pushed around the outside of the wall. Because it's tangential, and because it is high velocity in a circular inlet, it essentially--the highest velocity flow stays around the outside of the housing. And in this case, if it were toroidal and tangential, because the housing has no center, the flow can't get into the center.

But in [defendant's] filter, because it is an open housing, there is fluid in the housing completely. And there is some flow in that center part. It has to be, because the fluids are in contact.

But what I referred to as a toroidal flow or substantially toroidal flow in that case was the high-velocity fluid that is redirected around the outside from the centrifugal forces that exist on the fluid exerted by the housing.

*6 (D.I. 165 at 1207:2-23)

The court finds that the above recited testimony demonstrates that the accused device as a whole performs an equivalent function in an equivalent way to achieve an equivalent result as the claimed device. The question presented is whether this testimony is merely "generalized testimony regarding equivalence." *See Comark*, 156 F.3d at 1188. If *Hilton Davis* truly requires that each limitation of a claim be linked with a specific element of an accused device and then be compared--in isolation--as to function, way and result, it is not clear to the court whether plaintiff has passed muster under this more rigorous test. [FN3]

FN3. There can be no dispute that circular housings constitute part of the prior art and that circular housings, in and of themselves, are not "toroidal," a very particular word used by the patentee to describe the physical configuration (not the function) of the preferred embodiment. As noted, it is only when a circular housing is combined with other elements-- some claimed (e.g., a tangential inlet), some not (e.g., a high rate of blood flow)--that a circular housing functions

to define a substantially toroidal flow path, according to plaintiff's expert witnesses.

There is substantial evidence to support the jury's verdict based on plaintiff's theory of the case. Having assembled the factual record and framed the pertinent legal questions, the court leaves the jury verdict undisturbed, confident that the appellate process will clarify how the doctrine of equivalents should be applied under the particular circumstances presented at bar.

B. Obviousness

Defendant challenges the jury's finding that it had not proved by clear and convincing evidence that claims 1, 3-6, 8, 10-13, and 15 of the '474 patent were invalid [FN4] due to obviousness. [FN5] (D.I. 153 at 4-5) In its motion for JMOL, defendant appears to argue that no reasonable jury could have reached this conclusion because "there were no factual disputes [relating to obviousness] for the jury to resolve." (D.I. 170 at 17)

FN4. A patent is not held valid for all purposes, "but, rather, not invalid on the record before the court." *Shelcore, Inc. v. Durham Indus., Inc.*, 745 F.2d 621, 627 (Fed.Cir.1984) (emphasis added).

FN5. Defendant does not challenge the jury's determination that the '474 patent was not invalid due to anticipation.

A finding of obviousness involves a determination that "the differences between the subject matter [of the patent] and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." 35 U.S.C. § 103. The ultimate determination of obviousness is a question of law based on underlying factual inquiries. See *Richardson-Vicks*, 122 F.3d at 1479. Those factual inquiries involve consideration of the four so-called *Graham* factors: (1) the scope and content of the prior art; (2) the differences between the claims and the prior art; (3) the level of ordinary skill in the pertinent art; [FN6] (4) and any secondary considerations of nonobviousness, such as commercial success. See *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17-18 (1966); *B.F. Goodrich Co. v. Aircraft Braking Sys. Corp.*, 72 F.3d 1577, 1582 (Fed.Cir.1996).

FN6. The factfinder must evaluate the invention, "not through the eyes of the

inventor, who may have been of exceptional skill, but as by one of 'ordinary skill.'" *Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 1138 (Fed.Cir.1985). Both parties agreed, for purposes of this trial, that the level of ordinary skill in the art was a person with at least a high school diploma and college training in mechanical engineering, with some knowledge of flow dynamics and plastics. (D.I. 166 at 1334:1-5)

A patentee need not submit any evidence in support of the jury's conclusion of nonobviousness. See *Orthokinetics, Inc. v. Safety Travel Chairs, Inc.*, 806 F.2d 1565, 1570 (Fed.Cir.1986). It is the challenger's burden of proving obviousness by clear and convincing evidence, and the court "must not lose sight of the presumption of validity." *Perkin-Elmer Corp.*, 732 F.2d at 893; *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 1459 (Fed.Cir.1984). Obviousness must be determined as of "the time the invention was made." 35 U.S.C. § 103; *Richardson-Vicks*, 122 F.3d at 1480. In determining obviousness, factfinders must avoid the "the subtle but powerful attraction of a hindsight-based obviousness analysis." *In re Dembiczak*, No. 98-1498, 1999 WL 246572, at *4 (Fed.Cir. Apr. 28, 1999). The best defense against hindsight obviousness analysis is a "rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references." *Id.* The dispositive issue, then, is whether defendant presented clear and convincing evidence of a suggestion, teaching, or motivation to combine the relevant prior art references.

*7 The relevant prior art is that existing prior to April 23, 1993, the effective filing date of the '474 patent. (D.I. 166 at 1332:23-25) In the motion at bar, defendant focuses specifically on U.S. Patent Nos. 299,269 (the Gish patent) and 4,806,135 (the Siposs patent) as invalidating prior art. Specifically, defendant argues that the '474 patent is nothing more than an obvious combination of the Gish and Siposs arterial filter patents.

1. Scope and Content of the Prior Art

Like the '474 patent, the Gish filter includes a housing with a central indentation in the top, an offset gas vent situated approximately 180 degrees from the inlet at the maximum housing height, and a filter element, centrally disposed with respect to the blood flow, supported within the housing. (D.I.177, Ex. 3) Also like the '474 patent, the Gish filter permits visibility into the core of the filter element. Blood enters the

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Gish filter through an inlet, which directs the blood toward the center of the filter. The blood then impinges upon a turning vane that directs the blood around the housing element.

The Siposs patent teaches away from the use of turning vanes because "[t]he edges of the vanes may cause trauma to red blood cells as they impinge upon the vanes during flow." (D.I.171, Ex. K, col.1, lns.45-46) Accordingly, the Siposs patent substitutes a tangential blood inlet for the turning vanes of the Gish patent. This tangential inlet, combined with a circular housing, does away with the need for turning vanes by generating "rotation of the liquid within the body [of the device, thus causing] bubble separation." (D.I.171, Ex. K, col.2, lns.31-32) Defendant argues that a person of ordinary skill in the art would have known to combine the offset gas vent and central housing indentation of the Gish filter with the Siposs filter's tangential inlet.

2. Differences Between the Prior Art and the Claimed Invention

In support of this argument, defendant contends that there are only insignificant differences between the '474 patent, on the one hand, and Gish and Siposs patents on the other. Defendant suggests that the only difference between the Gish filter and the '474 patent is the inlet configuration. (D.I. 170 at 19) The '474 patent utilizes a tangential inlet while the Gish filter employs a straight inlet that directs the blood toward the filter's center where it impinges upon the turning vanes. Significantly, two expert witnesses testified that the Gish filter does not create a toroidal blood flow path, as does the filter claimed by the '474 patent. (See D.I. 165 at 1200:22-1201:7, 1212:7-11) This is a substantial difference--especially since the '474 patent specifically teaches a housing element defining a substantially toroidal blood flow path. Indeed, plaintiff presented testimony suggesting that the Gish filter did not remove bubbles efficiently due to its non-toroidal blood flow. (D.I. 165 at 1214:12-1215:10)

Moreover, the Siposs filter, by minimizing blood flow trauma, teaches away from use of the Gish filter, which causes the blood flow to impinge violently upon the filter's turning vane surface. Thus, the teachings of the Siposs patent, combined with the Gish filter's inefficient debubbling, make the combination of elements from the Siposs and Gish filters less, rather than more, obvious to one of ordinary skill in the art.

*8 The Siposs patent, on its own, does not render the

'474 patent obvious. Although it employs a tangential blood inlet, it utilizes a centrally disposed gas vent, and it lacks an indentation in the filter top. Consequently, it does not provide visibility to the center of the filter element. Conversely, providing visibility of the filter core was a chief aim of the '474 patent. (Col. 1, lns. 51-58; col. 3, lns. 17-27)

In light of these differences, the prior art does not suggest, teach, or motivate a combination of the Gish filter's offset gas vent and central housing indentation with the Siposs filter's tangential inlet. Although hindsight makes this combination seem obvious, "[c]ombining prior art references without evidence of such a suggestion, teaching, or motivation simply takes the inventor's disclosure as a blueprint for piecing together the prior art to defeat patentability." *In re Dembiczak*, 1999 WL 246572, at *5. Viewing the evidence presented at trial in plaintiff's favor, the court finds that reasonable jurors could conclude that the differences between the prior art and the claimed invention were significant enough to render the invention nonobvious to one of ordinary skill in the art.

C. Reasonable Royalty

Defendant argues that the \$26 per filter royalty awarded by the jury was excessive, contrary to the evidence and, in effect, an award of lost profits. [FN7] (D.I. 170 at 23-30) Barring JMOL on the infringement verdict, defendant seeks a new trial on the issue of damages. At issue is whether, in light of all the evidence, the \$26 royalty was so "outrageously high as to be unsupportable as an estimation of a reasonable[e] royalty." *Lindemann*, 895 F.2d at 1406. For the following reasons, the court finds that the evidence supports the jury's royalty determination.

FN7. The court previously dismissed plaintiff's claim for lost profits. (D.I.123)

The standard for damages for patent infringement is set forth in 35 U.S.C. § 284. Section 284 provides that a patent owner whose patent has been infringed is entitled to "damages adequate to compensate for the infringement, but in no event less than a reasonable royalty for the use made of the invention by the infringer, together with interest and costs as fixed by the court." The reasonable royalty provision in the statute provides the "floor below which damage awards may not fall." *Rite-Hite Corp. v. Kelley Co.*, 56 F.3d 1538, 1544 (Fed.Cir.1995). The claimant bears the burden of proof on the issue of damages. *See Fromson v. Western Litho Plate & Supply Co.*, 853 F.2d 1568,

1574 (Fed.Cir.1988).

A reasonable royalty is a measure of recovery "intended to provide a just recovery to persons who for evidentiary or other reasons cannot prove lost profits or an established royalty." *Hayhurst v. Rosen*, No. CV-91-4496, 1992 WL 123178, at *13 (E.D.N.Y. May 18, 1992). The royalty is calculated as if the parties negotiated at arm's length as a willing licensor and a willing licensee on the date when the infringement began. *Rite-Hite*, 56 F.3d at 1554. Although this hypothetical negotiation is characterized as a willing licensee-willing licensor negotiation, "the result has more of the character of a forced settlement where neither party gets all it would wish." *Id.* at 1576 (Nies, J., dissenting in part) Where, as here, the parties were previously not "willing," the factfinder

*9 may consider additional factors to assist in the determination of adequate compensation for the infringement. These factors include royalties received by the patentee for the licensing of the patent in suit, opinion testimony of qualified experts, the patentee's relationship with the infringer, and other factors that might warrant higher damages.

Maxwell v. J. Baker, Inc., 86 F.3d 1098, 1109 (Fed.Cir.1996) (citing *Georgia-Pacific Corp. v. United States Plywood Corp.*, 318 F.Supp. 1116, 1120 (S.D.N.Y.1970)). The determination of a reasonable royalty is based upon the totality of the evidence, and the factfinder is "not limited to selecting one or the other of the specific royalty figures urged by counsel as reasonable." *Smithkline Diagnostics, Inc. v. Helena Labs. Corp.*, 926 F.2d 1161, 1168 (Fed.Cir.1991) ("SKD "). The royalty rate, however, should leave the infringer a reasonable profit. *See, e.g., Hughes Tool Co. v. Dresser Indus., Inc.*, 816 F.2d 1549, 1558 (Fed.Cir.1987).

For purposes of the hypothetical negotiation, the '474 patent is deemed valid, enforceable, and infringed. *See TP Orthodontics Inc. v. Professional Positioners Inc.*, 20 U.S.P.Q.2d 1017, 1025 (E.D.Wis.1991). In addition, the parties are presumed to know all the facts relevant to the negotiation. *See Georgia-Pacific Corp.*, 318 F.Supp. at 1121. Although the hypothetical negotiation is presumed to take place on the eve of first infringement, the court is permitted to consider facts and events that occurred after infringement began even though those facts could not have been known by the hypothesized negotiators. *See Fromson*, 853 F.2d at 1575.

A preliminary explanation of the parties' blood filter

sale practices is crucial to an understanding of this royalty dispute. As noted above, blood filters like the patent in suit serve as components in "extra corporeal" blood flow circuits. (D.I. 162 at 698:7-16) Plaintiff and defendant sell these filters separately at "stand alone" prices and as components in complete blood flow circuits, known as "tubing packs." Because consumers often demand that a tubing pack manufacturer include another manufacturer's filter in the tubing pack, plaintiff and defendant frequently sell "stand alone" filters to other tubing pack manufacturers. Indeed, defendant often purchased plaintiff's arterial filters for inclusion in defendant's own tubing packs. (D.I. 161 at 390:17-391:7) As an alternative to purchasing a competitor's filter, tubing pack manufacturers often obtain licenses from their competitors for the use of their filters. Such licenses require the payment of a royalty, typically based on a percentage of net sales or on a per filter dollar amount.

At trial, plaintiff presented the testimony of its royalty witness, Dr. Marion Stewart, who testified that a reasonable royalty would be \$28 for each infringing filter sold by defendant. Stewart based his opinion on information that would have influenced each party during a hypothetical licensing negotiation. Stewart first determined that defendant would pay, at most, a royalty of \$49 for each filter. He arrived at this figure by subtracting the price at which plaintiff would have sold filters to defendant (\$65) from the cost defendant would incur in manufacturing its own filters (\$16). (D.I. 161 at 417:2-419:25)

*10 Having calculated the maximum royalty defendant would pay, Stewart then calculated the minimum royalty that plaintiff's negotiators would accept. He arrived at this figure by considering how many of plaintiff's filters defendant might purchase for use in defendant's tubing packs. By analyzing defendant's past purchases of nonpatented filters from plaintiff, as well as defendant's market share, Stewart determined that plaintiff's negotiators would expect defendant to purchase between 15% to 45% of its filters from plaintiff. [FN8] Stewart concluded that, if plaintiff's filters accounted for only 15% of defendant's filter purchases, plaintiff's negotiators would demand a minimum royalty of \$7 per filter. [FN9] (D.I. 161 at 420:5-430:1)

FN8. Dr. Stewart admitted that these figures were imprecise because he lacked exact information on defendant's past filter purchases from plaintiff. (D.I. 161 at 426:22-427:3)

FN9. Dr. Stewart arrived at \$7 by multiplying \$46 (the amount of per filter profit plaintiff risked losing by licensing its filter to defendant) by 15% (defendant's minimum percentage of purchases). (D.I. 161 at 428:19-22)

Thus, Stewart determined that plaintiff would demand a minimum royalty of \$7 per filter while defendant would accept a maximum royalty of \$49 per filter. According to Stewart, none of the so-called *Georgia-Pacific* factors suggested a more specific range. Consequently, Stewart arrived at his reasonable royalty figure simply by selecting \$28 as the median between \$7 and \$49. (D.I. 161 at 430:2-14)

Defendant contends that Stewart's royalty calculation misled the jury by failing to account for several important factors. Specifically, defendant argues that Stewart did not consider plaintiff's other licensing agreements. According to defendant, royalties for plaintiff's other filters range between 3% to 7% of net sales, while the jury award allegedly constitutes 58% of defendant's net filter sales. (D.I. 170 at 24)

At trial, however, defendant offered little evidence to support these figures. [FN10] Defendant's damages expert, Arthur Cobb, testified that plaintiff had entered into licensing agreements with Johnson & Johnson and Shiley, from which plaintiff received royalties in the range of 2% to 6% of filter sales. Cobb later admitted, however, that he did not know the facts surrounding the licensing agreement with Shiley and that the royalties received from Johnson & Johnson resulted from a joint development project with plaintiff rather than from a competitive negotiation. (D.I. 164 at 1146:1-1147:3; 1148:4- 1149:19) Thus, the jury was entitled to discount the relevancy of these licensing agreements in its calculation of a reasonable royalty. Moreover, even if relevant, these other royalty rates did not require the jury to award a similar rate. *See SKD*, 926 F.2d at 1168 (upholding a 25% royalty where defendant offered evidence of other licensing agreements at rates of 3% to 5%).

FN10. Neither party offered licensing agreements into evidence.

Defendant also argues that Stewart, in calculating defendant's maximum acceptable royalty, did not consider lower filter prices offered by other manufacturers. Defendant suggests that it could have used these lower filter prices to negotiate a reduced purchase price for plaintiff's filter. This, defendant argues, required Stewart to reduce the upper limit of

acceptable royalties. Although defendant contends that the existence of less expensive filters would have reduced Stewart's royalty calculation, it offered no evidence of such prices. Without more, the jury was entitled to rely on Stewart's use of a \$65 filter sale price in his calculation of the upper limit of an acceptable royalty.

*11 Defendant also objects that the jury's royalty award does not allow it a reasonable profit. Defendant argues that Stewart incorrectly assumed that, in light of defendant's \$84 "stand alone" filter sale price, a \$28 royalty would permit defendant a reasonable profit. According to defendant, the majority of its filter sales occur as components in bundled tube packs. Defendant claims that it sells these bundled filters at a considerably lower per filter price than in "stand alone" filter sales. Defendant, however, offered no evidence of its bundled filter sale prices. [FN11] Defendant's expert, Cobb, admitted that he did not know defendant's bundled filter sale price. (D.I. 164 at 151:25-152:2) The only evidence before the jury relating to the sale price of defendant's filters was that offered by plaintiff, which revealed that defendant charged \$84 for its "stand alone" filters. (D.I. 161 at 443:21-444:6; 458:7-460:20; D.I. 177, Ex. 4) Without competent evidence of defendant's bundled filter rates, the jury was entitled to accept this "stand alone" price as the only relevant price in its calculation of a reasonable royalty. Indeed, "if evidentiary imprecision is due to inadequacy of the infringer's records, uncertainty is resolved against the wrongdoer." *Sensonic, Inc. v. Aerosonic Corp.*, 81 F.3d 1566, 1572-73 (Fed.Cir.1996); *see also TWM Mfg. Co. v. Dura Corp.*, 789 F.2d 895, 900 (Fed.Cir.1986) (affirming the resolution of damages ambiguities against infringer who failed to keep accurate records). [FN12] At this \$84 per filter sale price, a \$26 dollar royalty would leave defendant a reasonable profit on its "stand alone" filter sales.

FN11. In its opening brief, defendant claims, without supporting evidence, that its per filter profit on bundled filters sales is about \$29. (D.I. 170 at 26)

FN12. Defendant attempts to distinguish these cases on the ground that both involve defendants who destroyed or lost evidence. The underlying principle, though, applies equally to defendant, who failed to produce evidence exclusively within its control.

Finally, defendant claims that the jury awarded a royalty "in an amount far greater than [plaintiff] could

have obtained under its [previously denied] lost profits claim." (D.I. 170 at 23) In support of this argument, defendant notes that plaintiff's filters are "sold in tubing packs for approximately \$45 per filter" and that plaintiff's costs associated with these sales are \$19 per filter. From these figures, defendant concludes that plaintiff earns a \$26 per filter profit on tubing pack sales of its filters--"the same as the royalty awarded by the jury." (D.I. 170 at 26)

For purposes of this hypothetical negotiation, however, plaintiff's "stand alone" per filter price (and not its tubing pack filter price) was at issue. The evidence confirms this. The evidence reveals that defendant previously purchased plaintiff's filters for use in defendant's own tubing packs. Stewart noted that plaintiff's negotiators would demand a royalty to compensate for lost profits on these "stand alone" filter sales to defendant, which occurred at an elevated, "list" price. (D.I. 161 at 398:5-9; 420:5-25)

Stewart testified that plaintiff would have sold its patented filter to defendant for about \$65 per filter. Subtracting production costs from this figure, Stewart concluded that plaintiff would reap a \$46 per filter profit from its sales to defendant. (D.I. 161 at 417:13-418:18; 423:3-424:3) Thus, the evidence and testimony presented indicates that the jury's \$26 royalty award is not, as defendant contends, a lost profits award in disguise. In fact, the jury's royalty award is about half of plaintiff's lost profits, and the Federal Circuit has affirmed at least one royalty award constituting half of a patentee's lost profits. *See Rite-Hite*, 56 F.3d at 1554-55.

*12 In sum, plaintiff carried its burden of proving a reasonable royalty, while defendant left plaintiff's royalty evidence essentially un rebutted at trial. In light of the evidence presented, the court finds that the jury's royalty award of a \$26 per filter is supported by the evidence.

D. Allegations of Attorney Misconduct

Defendant also moves for a new trial due to allegedly misleading and inappropriate statements made during plaintiff's closing arguments, which defendant asserts so prejudiced the jury that the court must order a new trial on the issues of willful infringement and damages. For the following reasons, the court declines to grant a new trial on these grounds. [FN13]

FN13. As an initial matter, the court notes that defendant failed to raise these objections

during plaintiff's closing arguments. Where a party fails to object to an improper closing argument, it waives later challenge to the argument. *See, e.g., Dunn v. Hovic*, 1 F.3d 1371, 1377 (3d Cir.1993); *Motorola, Inc. v. Interdigital Tech. Corp.*, 930 F.Supp. 952, 984 (D.Del.1996), *rev'd on other grounds*, 121 F.3d 1461 (Fed.Cir.1997).

1. Reference to the Siposs Patent

During trial, the court prohibited plaintiff from proving infringement by relying on the patent examiner's determination that the Siposs patent's "circular" or "curved" flow path constituted a "toroidal" flow path. The court reasoned that the examiner's use of "toroidal" conflicted with the court's claim construction, in which the court concluded that "toroidal" meant substantially doughnut-shaped and not merely "curved" or "circular." Defendant objects to two references to the Siposs patent made by plaintiff's counsel during closing arguments. (D.I. 166 at 1399:15-1400:9; 1458:12-18)

After reviewing the record, the court finds that neither reference to the Siposs patent constituted an attempt to prove infringement by employing the patent examiner's definition of "toroidal." Consequently, the court finds that plaintiff's mention of the Siposs patent did not prejudice the jury. Even if mention of the Siposs patent were prejudicial, the court gave a curative instruction, admonishing the jury that, "it is this court's interpretation of the claim language which controls, not the examiner's, and certainly not counsel's." (D.I. 166 at 1465:24-1466:1) Accordingly, plaintiff's references to the Siposs patent do not afford grounds for a new trial.

2. Reference to a "Confidential" Stamp on Documentary Evidence

At trial, defendant offered documents that purported to show a prior public use of the accused device. (*See* D.I. 171 at Ex. G) Pursuant to the court's protective order (D.I.19), defendant's counsel designated these documents "confidential." In his closing argument, plaintiff's counsel argued that these questionnaires did not support a finding of prior public use because the "confidential" designations indicated that "even within their own company [defendant was] marking them confidential." (D.I. 166 at 1454:10-11) Defendant appears to argue that this remark was a deliberate misrepresentation because "these 'confidential' designations were placed on the documents by counsel [rather than defendant's officials] in the course of this

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litigation pursuant to the protective order." (D.I. 170 at 33)

The protective order, however, covered only "nonpublic Material," such as "trade secrets or nonpublic technical, commercial, financial, personal, or business information." (D.I. 19 at 1-2) Indeed, the order specifically excluded "information or tangible items which at or prior to disclosure in this action are or were within public knowledge." (D.I. 19 at 2) The confidential designation on the documents therefore implies that they were "nonpublic Material." Plaintiff's counsel was entitled to argue the inference that such confidential documents do not support a finding of prior public use of the accused device.

3. Accusations of Evidence Tampering and Lying Under Oath

*13 During its opening arguments, defendant utilized an altered demonstrative exhibit to enhance the visibility of a date on a document. Defendant claims that plaintiff's counsel, in his closing, "intentionally blurred the distinction" between this demonstrative exhibit and defendant's Exhibit 93, causing the jury to believe that defendant altered the latter and that a defense witness lied under oath as to the authenticity of Exhibit 93. (D.I. 170 at 34) After reviewing the trial transcript, the court finds that plaintiff's closing fell well within the bounds of permissible argument. Accordingly, the court shall not grant a new trial on the issues of damages and willful infringement.

E. Willful Infringement

Finally, defendant moves for JMOL on the grounds that plaintiff failed to prove that defendant willfully infringed the '474 patent. In order to demonstrate willful infringement, the patentee must demonstrate, by clear and convincing evidence, that the infringer knew of the patent and that the infringer lacked a good faith basis for engaging in the infringing acts. *See SRI Int'l, Inc. v. Advanced Tech. Labs., Inc.*, 127 F.3d 1462, 1464-65 (Fed.Cir.1997); *Electro Med. Sys., S.A. v. Cooper Life Sciences, Inc.*, 34 F.3d 1048, 1056 (Fed.Cir.1994). The infringer's reliance on legal advice before engaging in infringing activities is probative of good faith; however, the factfinder may assess the thoroughness and competence of the legal opinion presented, as well as its objectivity. *See SRI Int'l*, 127 F.3d at 1465.

The record discloses substantial evidence from which a reasonable jury could find that defendant willfully

infringed the '474 patent. In support of its claim, plaintiff presented the testimony of defendant's chief patent counsel, Harold Patton, who admitted that defendant failed to procure a written legal opinion on its purported infringement of the '474 patent. (D.I. 161 at 466:19-467:6) Patton explained that defendant never obtained a written legal opinion because plaintiff filed suit before defendant could complete its investigation. (D.I. 161 at 480:6-20) Patton contended, however, that he "immediately" assigned an experienced patent attorney to investigate plaintiff's charges. Nonetheless, five months elapsed without the issuance of a written legal opinion. [FN14] This fact alone casts doubt on the immediacy of defendant's investigation.

FN14. Defendant received actual notice of the '474 patent no later than July 1, 1996. (D.I. 160 at 136:6-7) Plaintiff filed suit on December 4, 1996.

The patent attorney assigned to investigate plaintiff's charges of infringement eventually reported to Patton that defendant's filter did not infringe the '474 patent. (D.I. 161 at 475:23-476:3) Defendant, however, offered no evidence supporting the credibility or thoroughness of this (presumably oral) report. Indeed, Patton testified that the opinion consisted only of the attorney's conclusion that the infringing device "didn't include the record detail, the housing having the toroidal flow path." (D.I. 161 at 476:5-6) Without any basis for assessing the opinion's validity or the rigor of its analysis, the jury was entitled to conclude that defendant did not seriously pursue a legal opinion on infringement. [FN15] Furthermore, plaintiff elicited testimony indicating that defendant continued to manufacture and sell the accused device after it received notice of the '474 patent. (D.I. 162 at 513:17-514:6) Taken together, these facts support the jury's finding of willful infringement. Accordingly, the court shall deny defendant's motion for JMOL on the issue of willfulness.

FN15. Patton also testified that he regarded a written legal opinion as "superfluous." (D.I. 161 at 481:4-6)

IV. PLAINTIFF'S POST-TRIAL MOTIONS

A. Enhanced Damages

*14 Plaintiff seeks enhanced damages for defendant's willful infringement of the '474 patent. Under 35 U.S.C. § 284, a court may enhance damages up to three times the compensatory award. In deciding whether to

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grant enhancement, the "paramount determination ... is the egregiousness of the defendant's conduct based on all the facts and circumstances." *Read Corp. v. Portec, Inc.*, 970 F.2d 816, 826 (Fed.Cir.1992). Courts have identified several factors supporting a finding of egregiousness, including:

- (1) whether the infringer deliberately copied the ideas or design of another;
- (2) whether the infringer, when he knew of the other's patent protection, investigated the scope of the patent and formed a good-faith belief that it was invalid or that it was not infringed; and
- (3) the infringer's behavior as a party to the litigation.

Bott v. Four Star Corp., 807 F.2d 1567, 1572 (Fed.Cir.1986), *overruled on other grounds by*, *A.C. Aukerman Co. v. R.L. Chaides Constr. Co.*, 900 F.2d 1020 (Fed.Cir.1992). The Federal Circuit has encouraged courts to consider other factors such as defendant's size and financial condition, "closeness" of the case, the duration of defendant's misconduct, remedial action taken by the defendant, defendant's motivation for harm, and whether defendant attempted to conceal its misconduct. *See Read Corp.*, 970 F.2d at 827 (citing cases).

Several of these factors weigh against awarding enhanced damages. For instance, although the jury found that plaintiff had willfully infringed the '474 patent, there is no evidence suggesting that defendant deliberately copied the design of the patented device. The court also finds that defendant's trial tactics were not so egregious as to warrant enhanced damages. Further, there is no evidence that defendant attempted to conceal its infringing activities or that defendant infringed the '474 patent with a pernicious intent to harm plaintiff. Accordingly, the court declines to award enhanced damages.

B. Attorney Fees

Plaintiff moves the court to award attorney fees. Section 285 of Title 35 permits a court to award attorney fees to the prevailing party in "exceptional cases." When considering a request for attorney fees, the court first considers whether the case is exceptional. *See Interspiro USA, Inc. v. Figgie Int'l Inc.*, 18 F.3d 927, 933 (Fed.Cir.1994). Determining whether a case is exceptional involves consideration of factors such as "the closeness of the case" and "the parties' conduct and their counsel's trial tactics, including evidence of bad faith." *Afros S.P.A. v. Krauss-Maffei Corp.*, 671 F.Supp. 1402, 1440 (D.Del.1987), *aff'd*, 848 F.2d 1244 (Fed.Cir.1988).

These factors weigh against the award of attorney fees. As the court noted, defendant's infringement of the '474 patent was a "close" question. Moreover, defendant's trial tactics did not rise to the level of bad faith or vexatious litigation. The court concludes, therefore, that this case is not exceptional. Accordingly, plaintiff's motion for attorney fees shall be denied.

C. Permanent Injunction

*15 Plaintiff further moves the court to permanently enjoin defendant from further infringement of the '474 patent. Section 283 of Title 35 authorizes a court to "grant injunctions in accordance with the principles of equity to prevent the violation of any right secured by patent, on such terms as the court deems reasonable." Although the grant of an injunction is discretionary, generally courts grant injunctive relief following a finding of infringement. *See, e.g., W.L. Gore & Assocs., Inc. v. Garlock, Inc.*, 842 F.2d 1275, 1281 (Fed.Cir.1988). The Federal Circuit has indicated that once a finding of infringement has been made an injunction should issue absent a sufficient reason for denying it. *See id.*

Given the jury's finding of infringement, a permanent injunction is appropriate. Nonetheless, the jury's verdict rests on a close question of law. The court, therefore, shall stay its grant of a permanent injunction pending appeal.

D. Adjustment of Damages

In order to calculate damages for filters sold during the present litigation, plaintiff requests the court to order defendant to provide filter sales figures "from September 21, 1997 through the date of the Court's issuance of a permanent injunction." (D.I. 173 at 13) Because the court has stayed its grant of a permanent injunction pending appeal, the court shall similarly stay its order requiring defendant to produce the requested sales figures.

E. Prejudgment Interest

Finally, plaintiff moves the court to amend the judgment to provide for prejudgment interest, compounded quarterly, based on infringing sales beginning on April 19, 1996 and running through the date of the issuance of a permanent injunction or an amended judgment, whichever is later. Plaintiff proposes that the court use the prime rate in calculating prejudgment interest. (D.I. 173 at 14) Defendant does

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not contest the appropriateness of prejudgment interest, but it disputes plaintiff's proposed rate. Defendant proposes that the court award prejudgment interest at the prevailing three-month U.S. Treasury Bill rate rather than at the prime rate. (D.I. 175 at 17)

The rate of prejudgment interest, and whether it should be compounded, are matters left largely to the sound discretion of the district court. *See Bio-Rad Labs. Inc. v. Nicolet Instrument Corp.*, 807 F.2d 964, 969 (Fed.Cir.1986). Generally, courts award prejudgment interest to compensate a patentee for lost revenues during the period of infringement. Courts have recognized that the prime rate best serves this purpose because the prime rate represents the cost of borrowing money, which is "a better measure of the harm suffered as a result of the loss of the use of money over time." *Mars, Inc. v. Conlux USA Corp.*, 818 F.Supp. 707, 720-21 (D.Del.1993), *aff'd*, 16 F.3d 421 (Fed.Cir.1993). Accordingly, the court shall order defendant to pay prejudgment interest, compounded quarterly, at the prime rate. The court also shall grant plaintiff's request that the principal be calculated based

on a running monthly total of defendant's infringing sales beginning on April 19, 1996 and running through the later of imposition of a permanent injunction or entry of an amended judgment.

V. CONCLUSION

*16 For the aforementioned reasons, the court shall deny defendant's motion for JMOL. The court shall stay, pending decision by the Federal Circuit, an order permanently enjoining defendant from infringing the '474 patent. An order shall issue consistent with this memorandum opinion.

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